Request Summary

Frank's A Study of Colliding Flows and Feedback in Star Formation

Date submitted: Apr 15, 2014

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Title / FOS

TITLE	A Study of Colliding Flows and Feedback in Star Formation
REQUEST NUMBER	AST130036
REQUEST TYPE	Renewal
PRIMARY FIELD OF SCIENCE	123 - Stellar Astronomy and Astrophysics
SECONDARY FIELD(S) OF SCIENCE	122 - Planetary Astronomy
Star Formation	**KEYWORDS**
	Colliding Flows
	Molecular Clouds
	Feedback

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Supporting Grant(s) Information

PI NAME	Adam Frank
FUNDING AGENCY	National Science Foundation (NSF)
FUNDING AGENCY DIVISION	
PROGRAM OFFICER NAME	Katharina Lodders
PROGRAM OFFICER EMAIL	klodders@nsf.gov
FUNDING TITLE	From Central Engine to Bipolar Outflow: Binaries, MHD and the Evolution of Planetary Nebulae
AWARD NUMBER	406,000.00
AWARDED AMOUNT	135333
PERCENTAGE OF AWARD SUPPORTING THIS REQUEST	50
START DATE	09/01/2011
EXPIRATION DATE	08/31/2014
FIELD OF SCIENCE	Planetary Astronomy
COMMENT	

PI NAME	Adam Frank
FUNDING AGENCY	Dept of Energy (DoE and labs)
FUNDING AGENCY DIVISION	
PROGRAM OFFICER NAME	Sean Finnegan
PROGRAM OFFICER EMAIL	sean.finnegan@science.doe.gov
FUNDING TITLE	Resolving the Issue: The Dynamics of Magnetized Astrophysical Jets through Pulsed Powered HEDP Laboratory Studies
AWARD NUMBER	1,725,000.00
AWARDED AMOUNT	575000
PERCENTAGE OF AWARD SUPPORTING THIS REQUEST	50
START DATE	08/15/2012
EXPIRATION DATE	08/14/2015

FIELD OF SCIENCE	Stellar Astronomy and Astrophysics
COMMENT	

PI NAME	Adam Frank
FUNDING AGENCY	Other
FUNDING AGENCY DIVISION	Space Telescope Sci Institute
PROGRAM OFFICER NAME	Paula Sessa
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FUNDING TITLE	STSci - Hubble Telescope - The Reel Deal: Interpreting HST Multi-Epoch Movies of YSO JetsSpace
AWARD NUMBER	HST -AR-12128.01-A
AWARDED AMOUNT	95000
PERCENTAGE OF AWARD SUPPORTING THIS REQUEST	60
START DATE	10/01/2010
EXPIRATION DATE	09/30/2014
FIELD OF SCIENCE	Stellar Astronomy and Astrophysics
COMMENT	

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Resources Requested

Please estimate what percentage of the work you expect to do in this allocation will be the following types (the 3 numbers should sum to 100):

- Production (actually doing research): 99
- Exploration/porting (preparing to do research): 1

Please estimate what percentage of the jobs you expect to run in this allocation will be the following types (the 3 numbers should sum to 100):

- Submitted through command line/script: 100

Please estimate what percentage of the science runs you expect to perform in this allocation will be the following types (the 4 numbers should sum to 100):

- Independent but related (such as jobs that make up an ensemble or parameter sweeps): 100

RESOURCE NAME	SDSC Appro with Intel Sandy Bridge Cluster (Gordon Compute Cluster)
RESOURCE REQUESTED AMOUNT	2500000
	RESOURCE AWARDED AMOUNT

RESOURCE NAME	SDSC Medium-term disk storage (Data Oasis)
RESOURCE REQUESTED AMOUNT	3000
	RESOURCE AWARDED AMOUNT

RESOURCE NAME	TACC Dell PowerEdge C8220 Cluster with Intel Xeon Phi coprocessors (Stampede)
RESOURCE REQUESTED AMOUNT	5000000
	RESOURCE AWARDED AMOUNT

RESOURCE NAME	TACC Long-term tape Archival Storage (Ranch)
RESOURCE REQUESTED AMOUNT	12000
RESOURCE AWARDED AMOUNT	

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Abstract

Observational evidence from local star-forming regions mandates that star formation occurs shortly after, or even during, molecular cloud formation. Models of the formation of molecular clouds in large-scale colliding flows have identified the physical mechanisms driving the necessary rapid fragmentation. They also point to global gravitational collapse driving supersonic turbulence in molecular clouds. In this work we propose exploring the effect of {\it magnetic fields} and {\it shear} in the colliding flow on the resulting clouds and the ensuing gravitational collapse. We also explore the role of triggering in star formation, namely the ability of supersonic flows to drive stable pre-existing clouds into collapse. We are particularly interested in the formation of (planet forming) accretion disks in the aftermath of triggering and the role of fields in inhibiting or altering collapse. Three new publications came from results obtained with our previous XSEDE allocation (AST130036) and we now seek resources to continue and expand our work. To achieve this goal we request the support of 5.0 million SU's on Stampede at TACC, 2.5 million SU's on Gordon at SDSC.

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